

APPENDIX A --COPY OF RESPONSE AS FAXED ON FEBRUARY 25, 2005



The pagination of this copy of the Response has changed due to the increased font size and increased size of chemical formulas.

The original document as filed was signed by Sally A. Sullivan on February 25, 2005.

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**APPENDIX A --COPY OF RESPONSE AS FAXED ON FEBRUARY 25, 2005**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No. : 09/438,365  
Applicant: : Chu et al.  
Filed: : November 12, 1999  
Examiner: : Epps, J.  
For: New Transfection Reagents

Confirmation No.: 9217

Group Art Unit: 1635

Docket No. : 61-03

Customer No. : 23713

CERTIFICATE OF TRANSMISSION UNDER 37 CFR 1.8  
I hereby certify that this correspondence is being facsimile  
transmitted to the U.S. Patent and Trademark Office on  
February 25, 2005 FAX No. 703-872-9306

Lea Murray

**PRELIMINARY AMENDMENT FILED CONCURRENTLY WITH  
REQUEST FOR CONTINUED PROSECUTION**



MAIL STOP RCE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This amendment is submitted in response to the Office Action of November 26, 2004, and to a telephone interview with the Examiner on February 16, 2005. This amendment accompanies a Request for Continued Examination.

Applicant requests that the Amendment after Final that was filed on February 3, 2005 **not be entered**.

Applicant requests that the Supplemental Information Disclosure Statement filed Feb. 3, 2005 (in part electronically filed) **be entered**.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 42 of this paper.

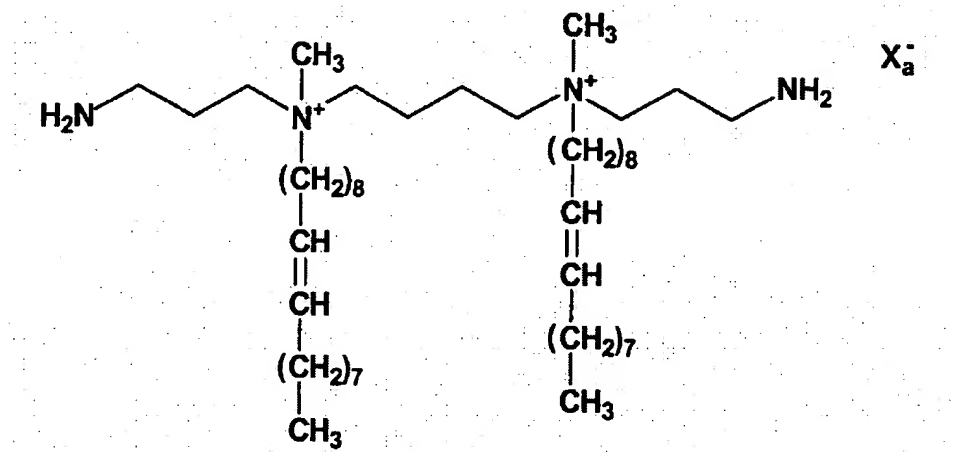
Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of the claims

1-9. (Canceled)

10. (Previously presented) A compound having the formula:

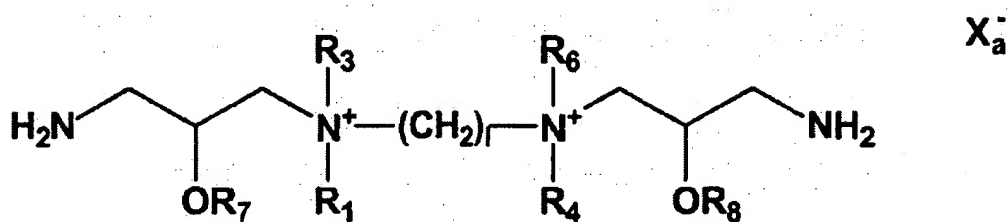


wherein

$X^-$  is a physiologically acceptable anion; and  $a$  is the number of anions which is equal to the number of positive charges in the compound divided by the valence of the anion.

11. (Canceled)

12. (Currently amended) A compound having the formula:



wherein

$\text{X}^-$  is a physiologically acceptable anion;

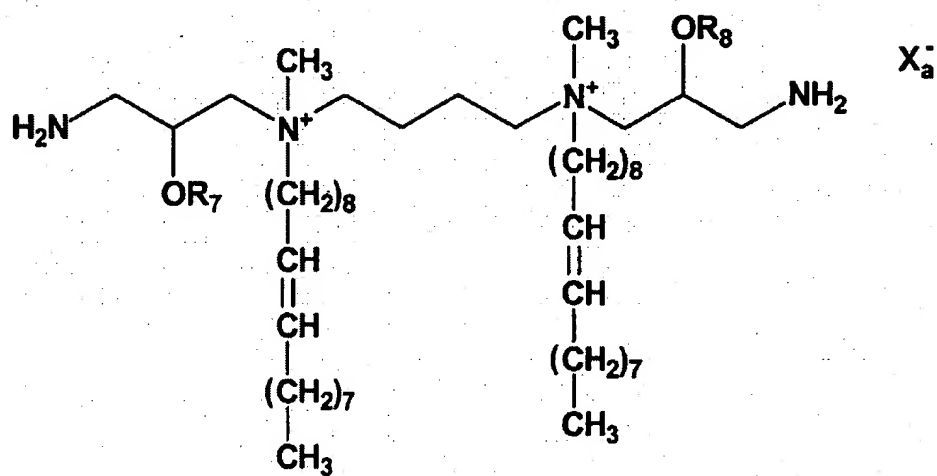
$a$  is the number of anions which is equal to the number of positive charges in the compound divided by the valence of the anion;

$\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$ , and  $\text{R}_6$ , independently of one another, are selected from the group consisting of H, an alkyl group, an alkenyl group, an alkynyl group, and an aryl group, wherein any one of  $\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$ , and  $\text{R}_6$  are optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group, and at least two of  $\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$ , and  $\text{R}_6$ , are straight-chain, branched, or cyclic alkyl, alkynyl, or alkenyl ~~or aryl~~ groups having from 8 to ~~about~~ 24 carbon atoms attached to each N and  $\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_6$  may optionally be covalently linked with each other;

$\text{R}_7$  and  $\text{R}_8$  are independently H or a carbohydrate; and

$l$  is an integer from 1 to about 4.

13. (Previously presented) The compound as claimed in claim 12, which is:

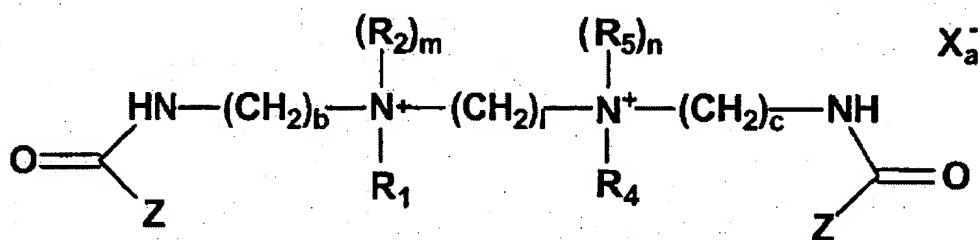


wherein R<sub>7</sub> and R<sub>8</sub> are independently H or a carbohydrate.

14. (Previously presented) The compound as claimed in claim 13, wherein R<sub>7</sub> and R<sub>8</sub> are H.

15. (Canceled)

16. (Currently amended) A compound having the formula:



wherein

$R_1$ ,  $R_2$ ,  $R_4$  and  $R_5$ , independently of one another, are selected from the group consisting of H, an alkenyl group, an alkynyl group, and an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group, and at least two of  $R_1$ ,  $R_2$ ,  $R_4$  and  $R_5$  are a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms attached to each N;

Z is selected from the group consisting of spermyl, spermidyl, amino acid, peptidyl, diaminoalkyl, and polyamine;

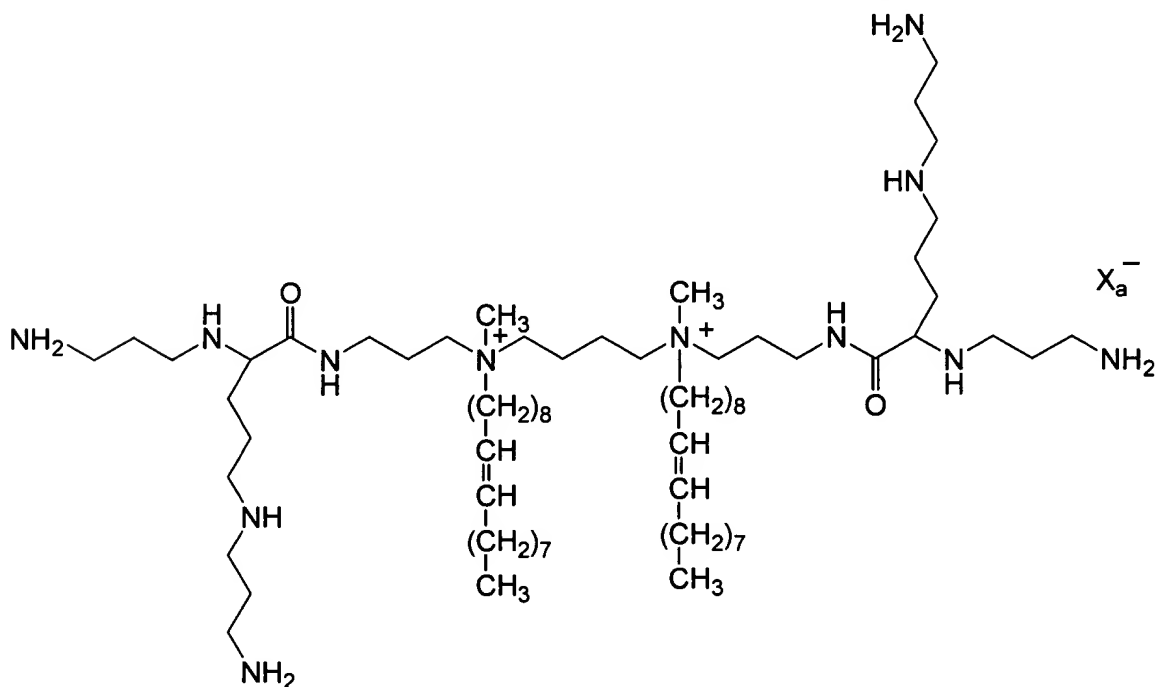
$X^-$  is a physiologically acceptable anion;

m and n are 0 or 1;

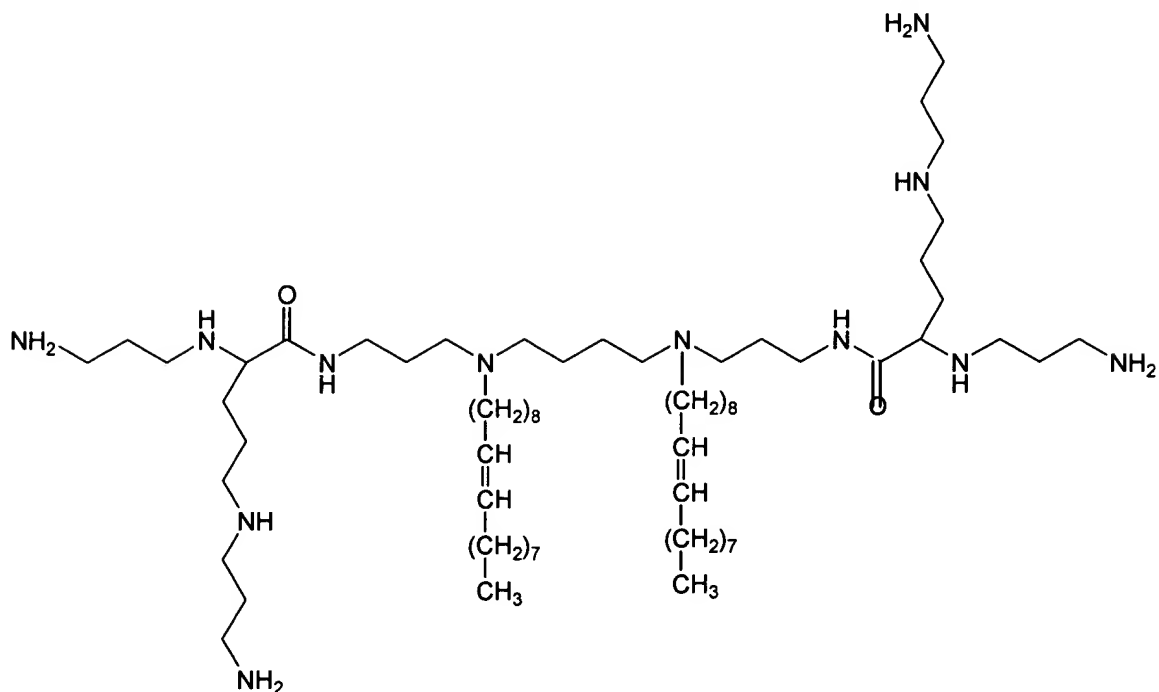
1, b and c are integers independently selected from 1 to about 4; and

a is the number of positive charges in the compound divided by the valence of the anion.

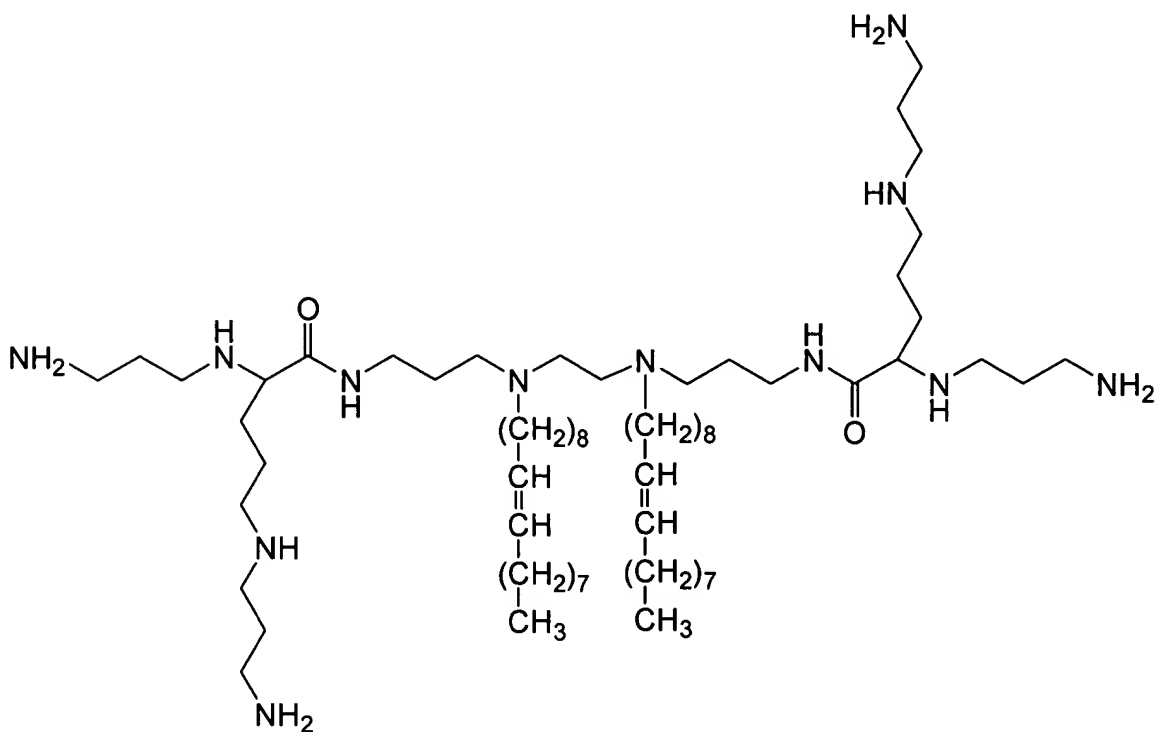
17. (Previously presented) The compound as claimed in claim 16, which is:



18. (Currently amended) The compound as claimed in claim 16, which is:

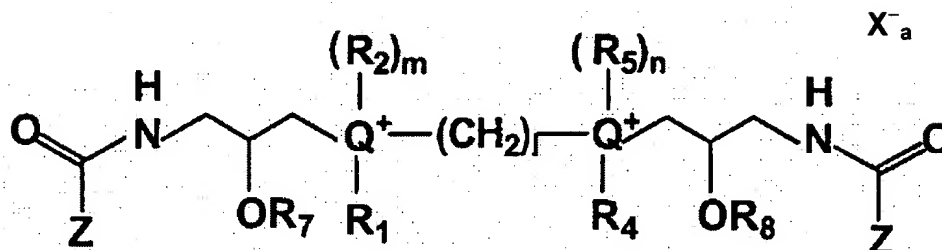


19. (Currently amended) The compound as claimed in claim 16, which is:



20. (Canceled)

21. (Currently amended) A compound having the formula:



wherein

Q is N;

$X^-$  is a physiologically acceptable anion;

a is the number of anions which is equal to the number of positive charges in the compound divided by the valence of the anion;

$R_1$  and  $R_4$ , independently of one another, are selected from the group consisting of H,  $-(CH_2)_p-D-Z$ , an alkyl group, an alkyl ether group, an alkenyl group, an aryl group, and an alkyl or alkyl ether group substituted by one or more of an alcohol, an aminoalcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, an alkylthio, a urea, a thiourea, a guanidyl, or a carbamoyl group,  $R_1$  and  $R_4$  may optionally be covalently linked with each other, to form a cyclic moiety; at least one of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkyl, alkenyl, or alkynyl or aryl group having from 8 to about 24 carbon atoms;

$R_2$  and  $R_5$ , independently of one another, are selected from the group consisting of H, an alkenyl group, an alkynyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

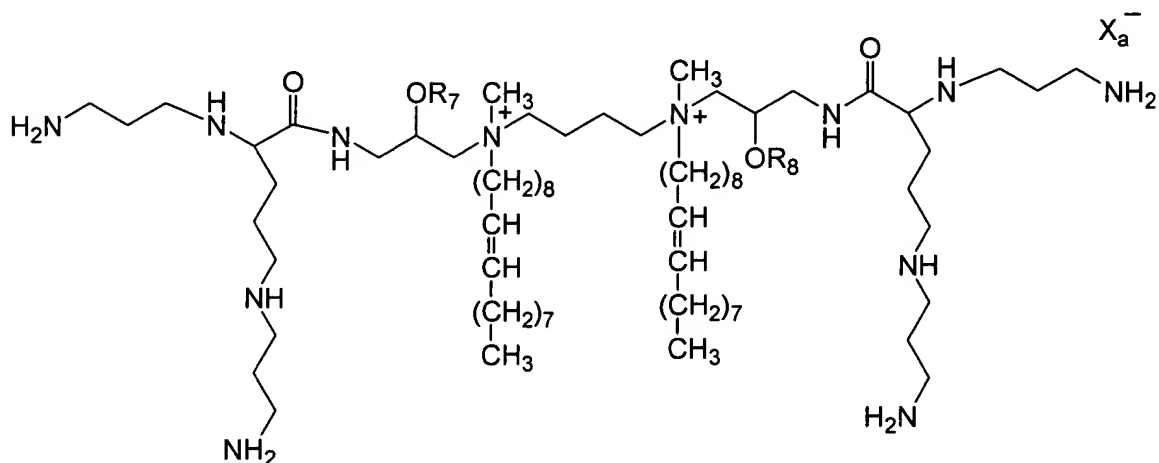
Z is selected from the group consisting of spermyl, spermidyl, aminoacid, peptidyl, diaminoalkyl, and polyamine;

D is N, O, S, or a bond;

$R_7$  and  $R_8$  independently are H or a carbohydrate;  
 ~~$m$  and  $n$  are 0 or 1, when  $m$  is 1, the Q bonded to  $R_2$  is positively charged~~  
~~and when  $n$  is 1 the Q bonded to  $R_5$  is positively charged;~~  
 $l$  is an integer selected from 1 to about 4; and  
 $p$  is an integer from 1 to about 10.

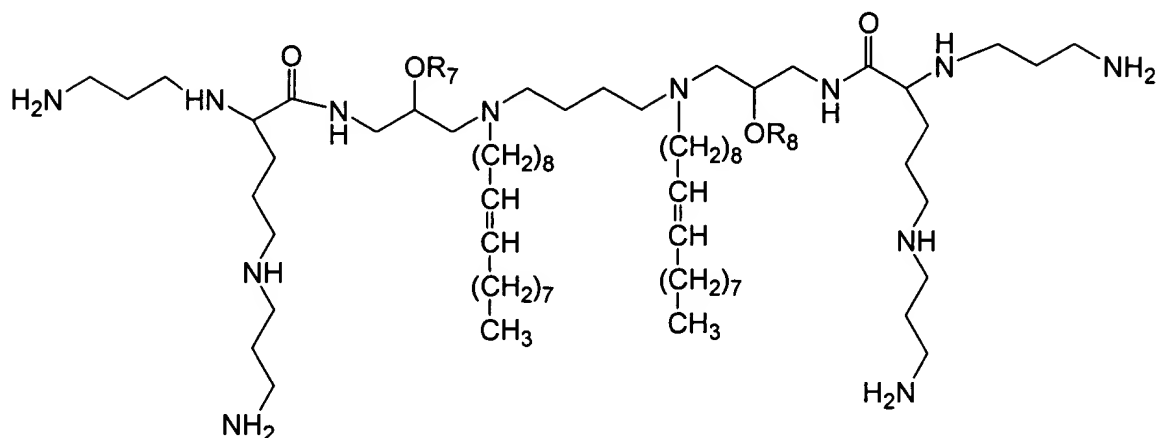
22. (Previously presented) The compound as claimed in claim 21 wherein  $R_7$  and  $R_8$  are H.

23. (Previously presented) The compound as claimed in claim 21 which is:



24. (Previously presented) The compound according to claim 23, wherein  $R_7$  and  $R_8$  are H.

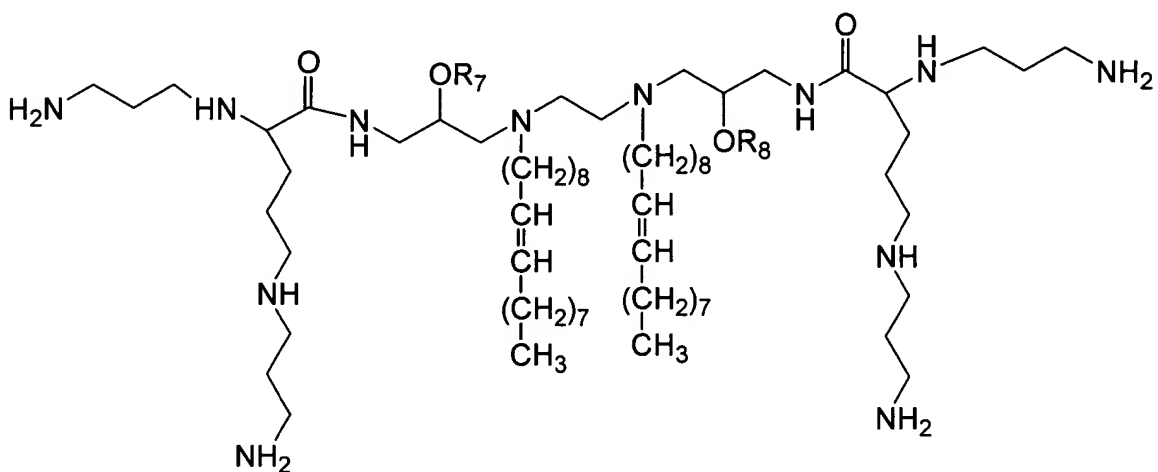
25. (Currently amended) The compound according to claim 21, which is



wherein R<sub>7</sub> and R<sub>8</sub> independently are H or a carbohydrate.

26. (Previously presented) The compound as claimed in claim 25, wherein R<sub>7</sub> and R<sub>8</sub> are H.

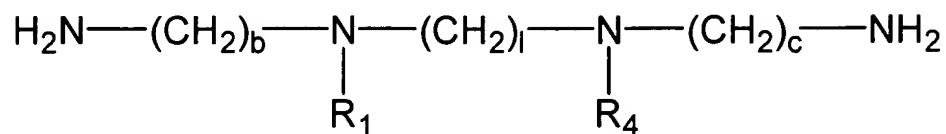
27. (Currently amended) The compound as ~~claimed in claim 21~~, which is



wherein R<sub>7</sub> and R<sub>8</sub> independently are H or a carbohydrate.

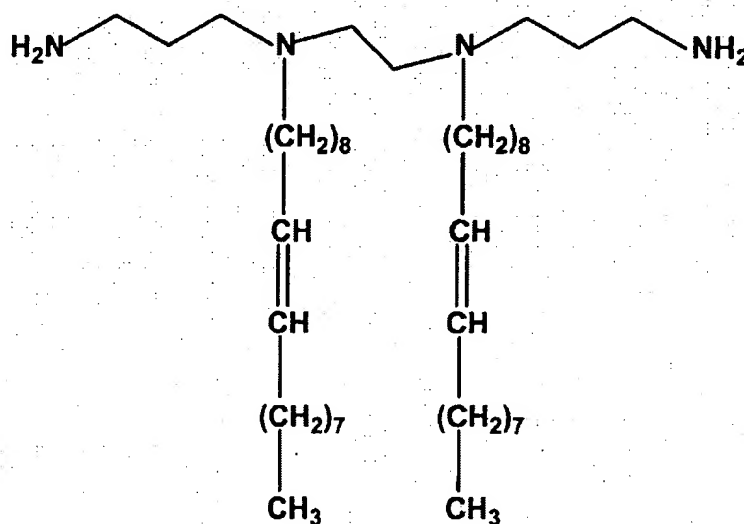
28. (Previously presented)The compound as claimed in claim 27, wherein R<sub>7</sub> and R<sub>8</sub> are H.

29. (Previously presented) A compound having the formula:

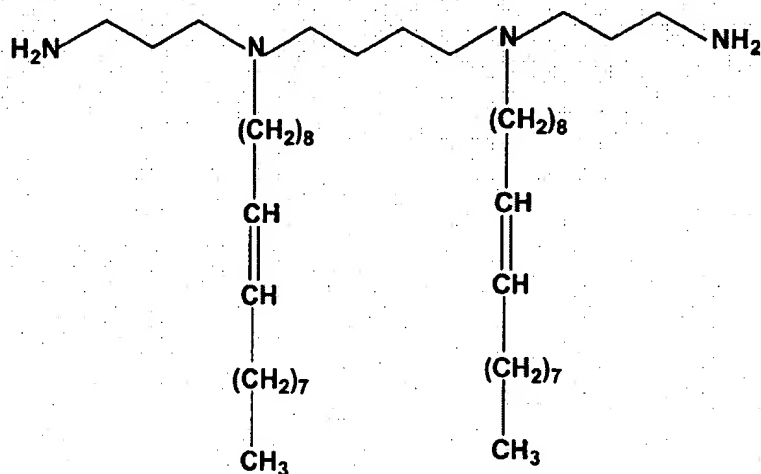


wherein each of  $\text{R}_1$  and  $\text{R}_4$  is a  $-(\text{CH}_2)_8-\text{CH}=\text{CH}-(\text{CH}_2)_7-\text{CH}_3$  group; and  $l$ ,  $b$ , and  $c$  are integers independently selected from 1 to about 4.

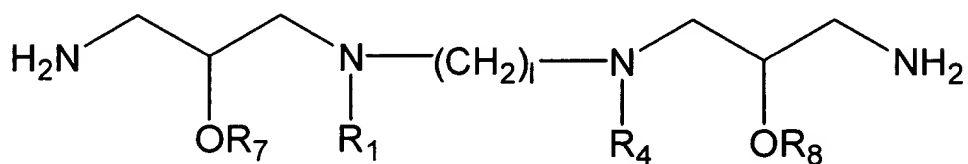
30. (Previously presented) The compound as claimed in claim 29, which is:



31. (Previously presented) The compound as claimed in claim 29, which is:



32. (Currently amended) A compound having the formula:



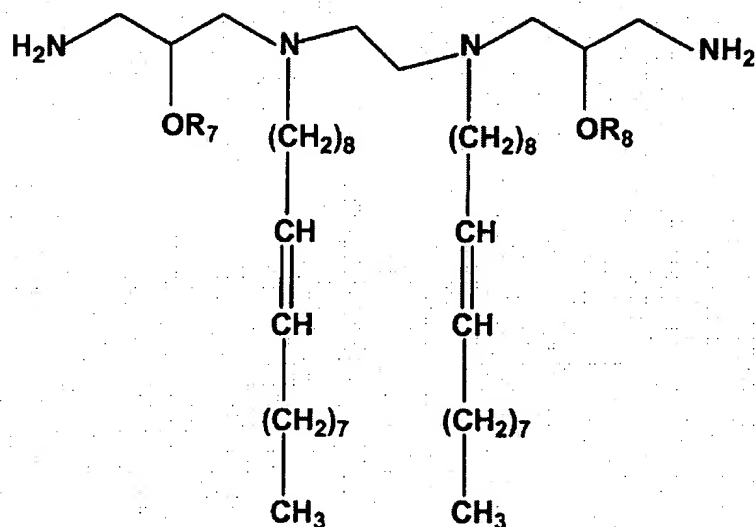
wherein

each of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkenyl, or alkynyl, ~~or aryl~~ group having from about 8 to about 24 carbon atoms;

$R_7$  and  $R_8$  are independently H or a carbohydrate; and

$l$  is an integer independently selected from 1 to 4.

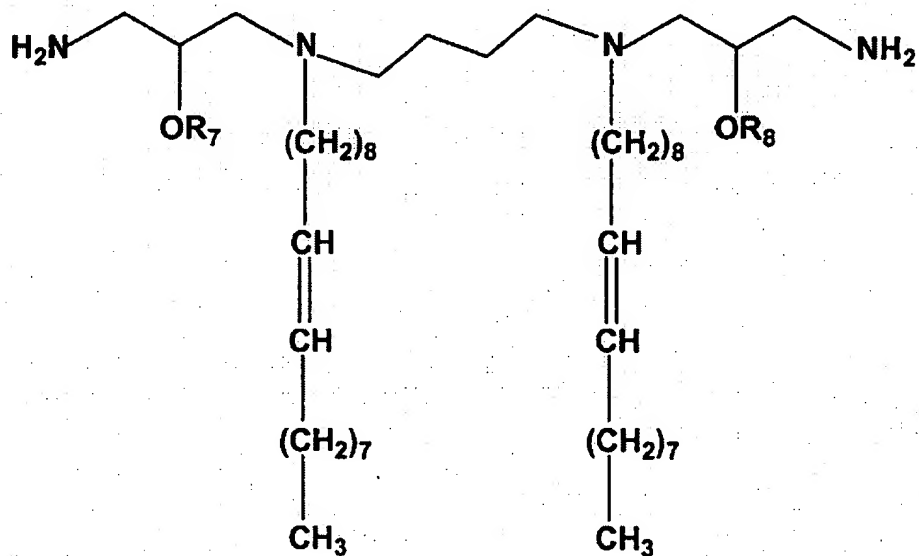
33. (Previously presented) The compound as claimed in claim 32, which is:



wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

34. (Previously presented) The compound as claimed in claim 33, wherein  $R_7$  and  $R_8$  are H.

35. (Previously presented) The compound as claimed in claim 32, which is:

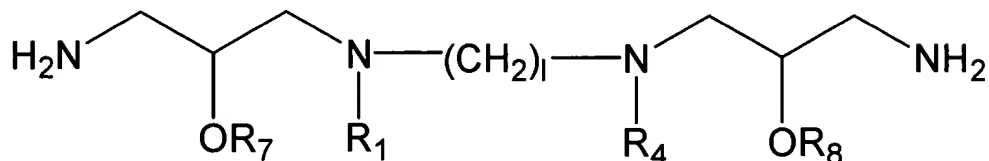


wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

36. (Previously presented) The compound as claimed in claim 35, wherein R<sub>7</sub> and R<sub>8</sub> are H.

37. (Canceled)

38. (Previously presented) A compound having the formula:



wherein

**I is 4.**

R<sub>1</sub> and R<sub>4</sub> are straight-chain alkyl groups having 14 or 16 carbon atoms,

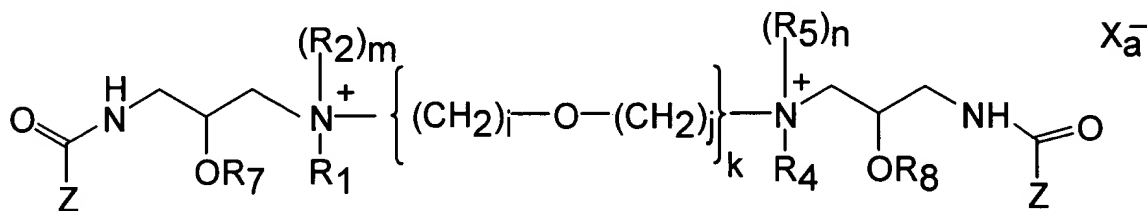
and

**R<sub>7</sub> and R<sub>8</sub> are independently selected from H or a carbohydrate.**

39. (Canceled)

40. (Previously presented) The compound as claimed in claim 38, wherein R<sub>7</sub> and R<sub>8</sub> are both H.

41. (Currently amended) A compound having the formula:



wherein

Z is selected from the group consisting of amine, spermiyl, carboxyspermiyl, guanidyl, spermidinyl, putricinyl, diaminoalkyl, pyridyl, piperidinyl, pyrrolidinyl, polyamine, amino acid, peptide and protein;

D is Q or a bond;

p is an integer from 1 to about 10;

R<sub>1</sub> and R<sub>4</sub>, independently of one another, are selected from the group consisting of H,  $-(CH_2)_p-D-Z$ , an alkyl group, an alkenyl group, an aryl group, an alkynyl group, and an alkyl ether group wherein any one of R<sub>1</sub> and R<sub>4</sub> are optionally substituted by one or more of an alcohol, an aminoalcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, an alkylthio, a urea, a thiourea, a guanidyl, or a carbamoyl group, R<sub>1</sub> and R<sub>4</sub> may optionally be covalently linked with each other to form a cyclic moiety; and at least one of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from 8 to about 24 carbon atoms; and

R<sub>2</sub> and R<sub>5</sub>, independently of one another, are selected from the group consisting of H, an alkenyl group, an alkynyl group, an aryl group and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide; an ester, a mercaptan, a urea, a thiourea, a guanidyl and a carbamoyl group;

R<sub>7</sub> and R<sub>8</sub> are independently H or a carbohydrate;

X<sup>-</sup> is a physiologically acceptable anion;

a is the number of positive charges in the compound divided by the valence of the anion;

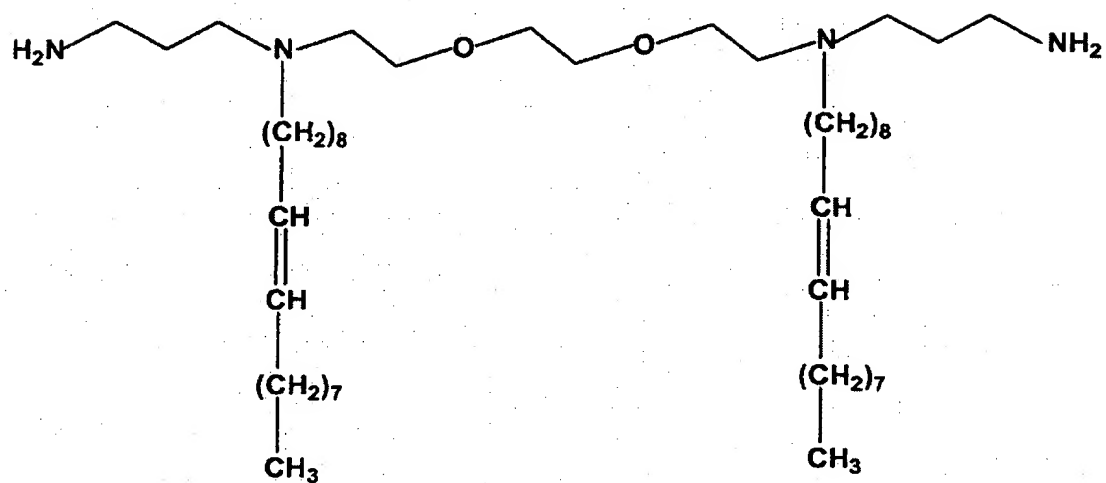
m and n are ~~0 or~~ 1;

i and j are integers selected from 2 to about 3; and

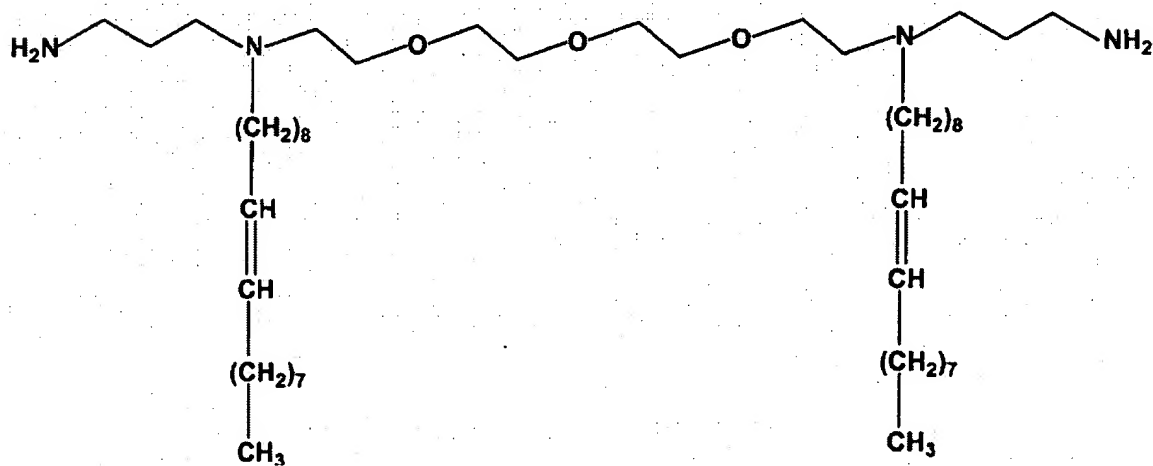
k is an integer selected from 1 to about 3.

42. (Canceled)

43. (Previously presented) A compound having the formula:

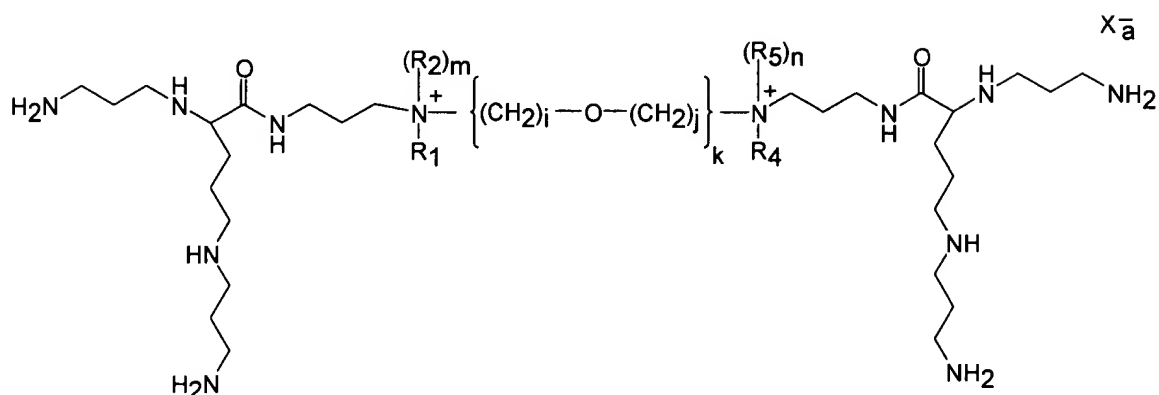


44. (Previously presented) A compound having the formula:



45. (Canceled)

46. (Currently amended) A compound having the formula:



wherein

each of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms;

R<sub>2</sub> and R<sub>5</sub>, independently of one another, are selected from the group consisting of a, an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

X<sup>-</sup> is a physiologically acceptable anion;

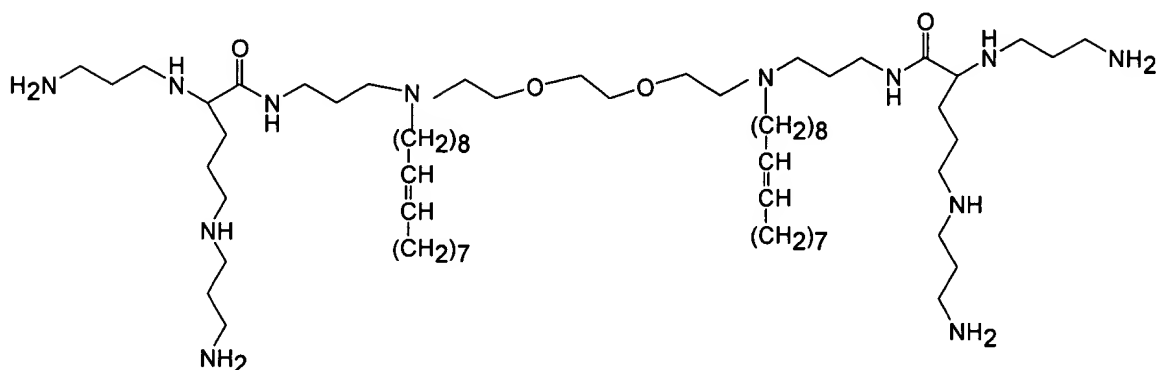
a is the number of positive charges in the compound divided by the valence of the anion;

~~m and n are 0 or 1, when m is 1, the N bonded to R<sub>2</sub> is positively charged and when n is 1, the N bonded to R<sub>5</sub> is positively charged;~~

i and j are integers selected from about 2 to about 3; and

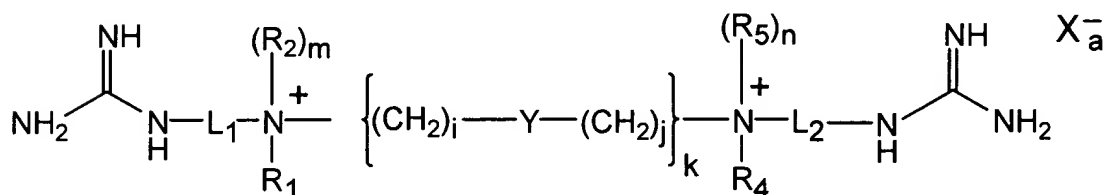
k is an integer selected from 1 to about 3.

47. (Currently amended). The compound ~~as claimed in claim 46~~, which is:



48. (Canceled)

49. (Currently amended) A compound having the formula:



wherein

each of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms;

$R_2$  and  $R_5$ , independently of one another, are selected from the group consisting of an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

$m$  and  $n$  are 0 or 1;

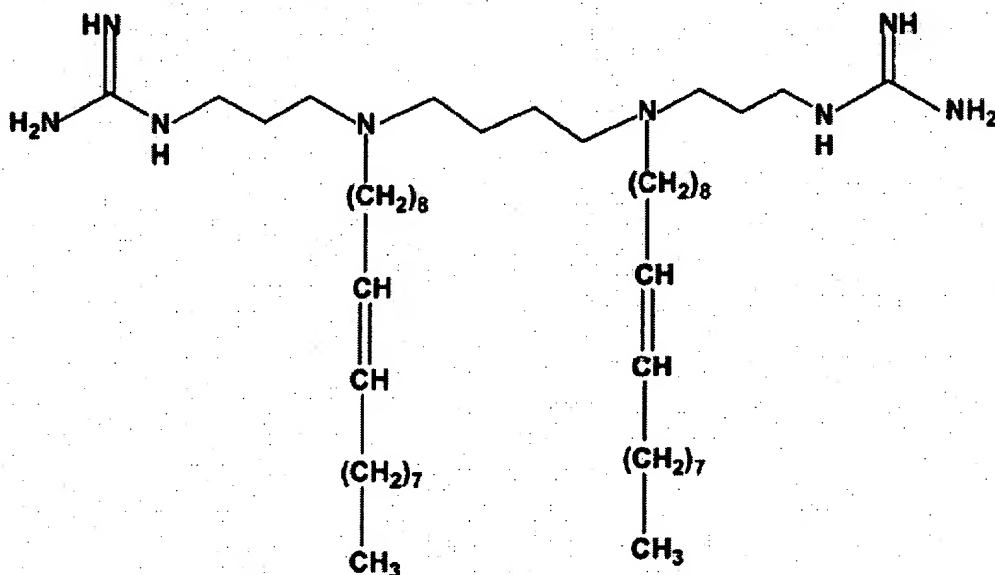
$i$  and  $j$  are integers from about 2 to about 3;

$k$  is an integer from 1 to about 3;

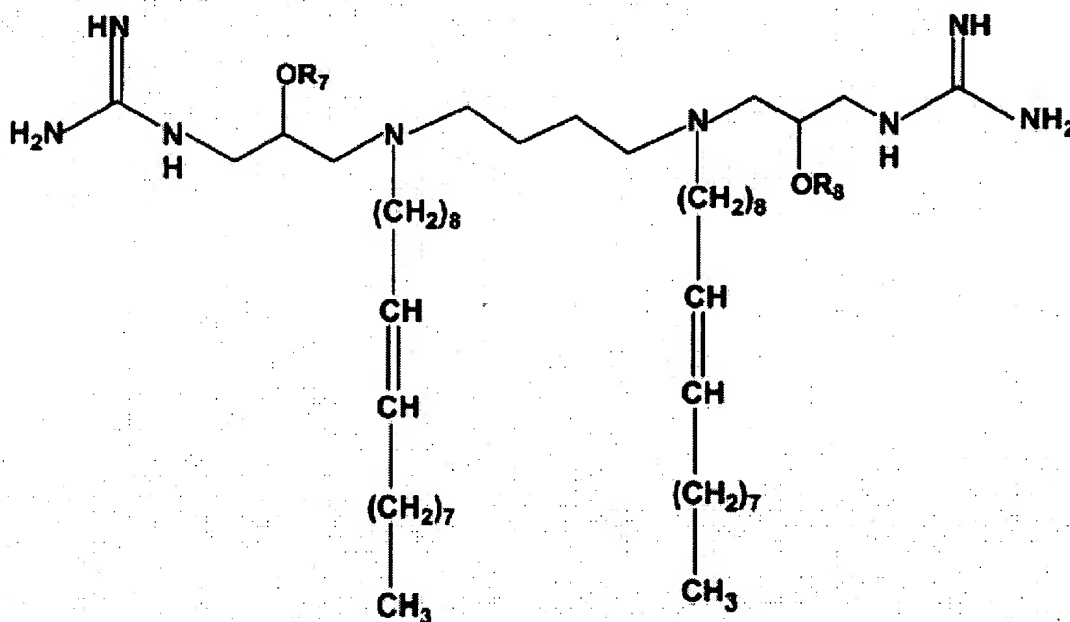
$L_1$  and  $L_2$ , independently from one another, are an alkylene or an alkylene ether; and

Y is selected from the group consisting of CH<sub>2</sub>, O, S and NH.

50. (Currently amended) The compound as claimed in claim 49, which is:



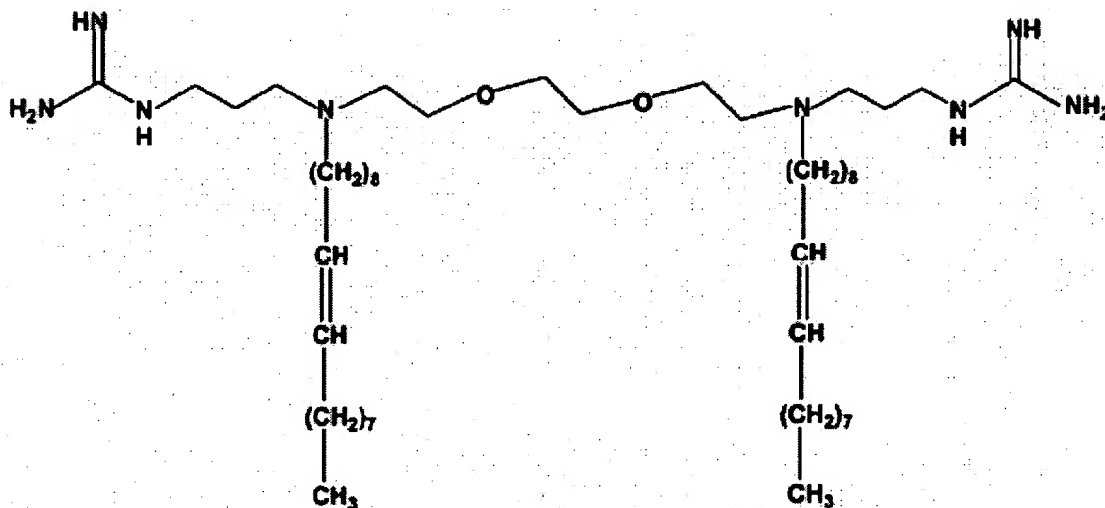
51. (Previously presented) A compound having the formula:



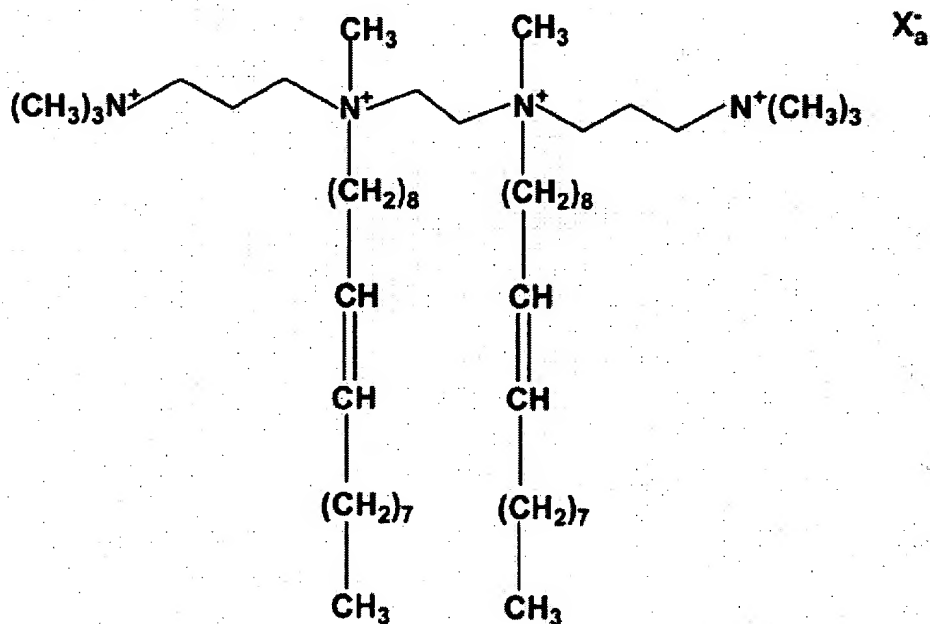
wherein R<sub>7</sub> and R<sub>8</sub> are independently H or a carbohydrate.

52. (Previously presented) The compound as claimed in claim 51, wherein  $R_7$  and  $R_8$  are H.

53. (Previously presented) A compound having the formula:



54. (Previously presented) A compound having the formula:

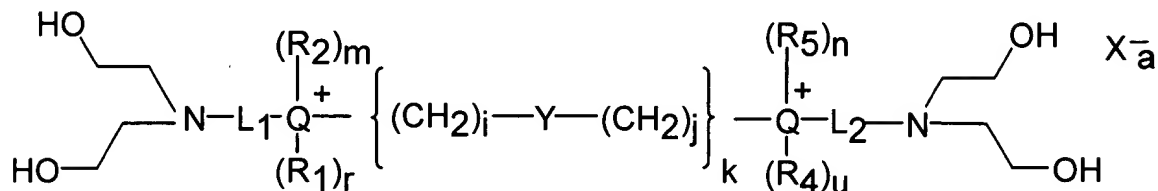


wherein

$\text{X}^-$  is a physiologically acceptable anion; and

a is the number of positive charges in the compound divided by the valence of the anion.

55. (Currently amended) A compound having the formula:



wherein

Q is N;

X<sup>-</sup> is a physiologically acceptable anion;

a is the number of anions which is equal to the number of positive charges in the compound divided by the valence of the anion;

R<sub>1</sub> and R<sub>4</sub>, independently of one another, are selected from the group consisting of H,  $-(\text{CH}_2)_p\text{-D-Z}$ , an alkyl group, an alkyl ether group, an alkenyl group, an aryl group, and an alkyl or alkyl ether group substituted by one or more of an alcohol, an aminoalcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, an alkylthio, a urea, a thiourea, a guanidyl, or a carbamoyl group, R<sub>1</sub> and R<sub>4</sub> may optionally be covalently linked with each other, to form a cyclic moiety; and at least one of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from 8 to about 24 carbon atoms;

R<sub>2</sub> and R<sub>5</sub>, independently of one another, are selected from the group consisting of H, an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

Z is selected from the group consisting of amine, spermiyl, spermidyl, carboxyspermiyl, guanidyl, spermidinyl, putricinyl, pyridyl, piperidinyl, pyrrolidinyl, aminoacid, peptidyl, diaminoalkyl, and polyamine;

D is N, O, S, or a bond;

i and j are integers from about 2 to about 3;

k is an integer from 1 to about 3;

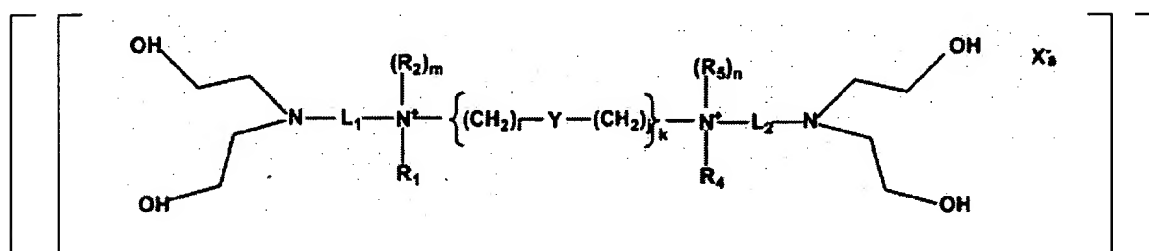
m, n, r and u are 0 or 1;

p is an integer from 1 to about 10;

L<sub>1</sub> and L<sub>2</sub>, independently from one another, are an alkylene or an alkylene ether; and

Y is selected from the group consisting of CH<sub>2</sub>, O, S and NH.

56. (Currently amended) ~~[[A]]~~ The compound as claimed in claim 55 having the formula:



wherein

~~X<sup>-</sup> is a physiologically acceptable anion;~~

~~a is the number of positive charges in the compound divided by the valence of the anion;~~

R<sub>1</sub> and R<sub>4</sub>, independently of one another, are straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl groups having from about 8 to about 24 carbon atoms ~~[[;]]~~

~~R<sub>2</sub> and R<sub>3</sub>, independently of one another, are selected from the group consisting of H, an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;~~

~~m and n are 0 or 1;~~

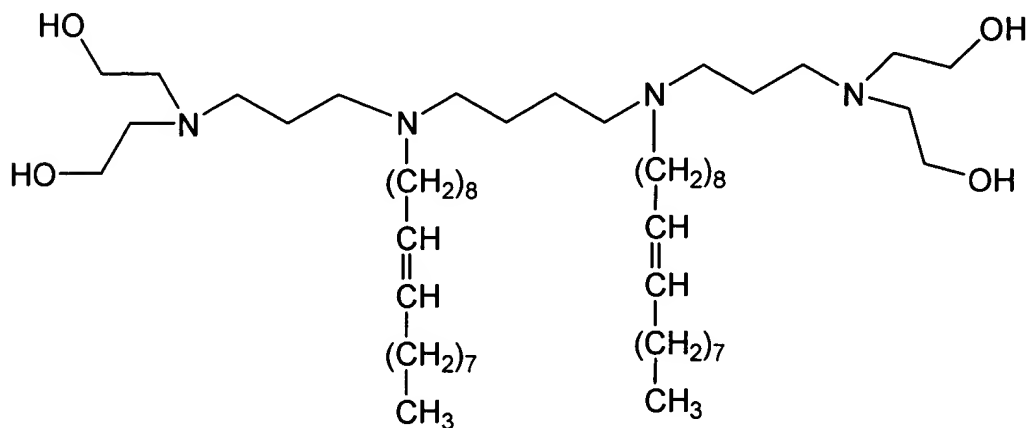
~~i and j are integers from about 2 to about 3;~~

~~k is an integer from 1 to about 3;~~

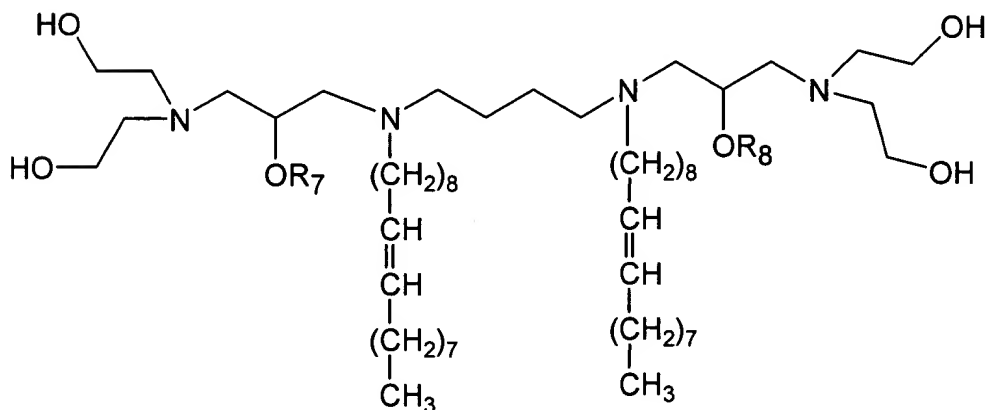
~~L<sub>1</sub> and L<sub>2</sub> independently from one another, are an alkylene or an alkylene ether; and~~

~~Y is selected from the group consisting of CH<sub>2</sub>, O, S and NH.~~

57. (Previously presented) A compound having the formula:



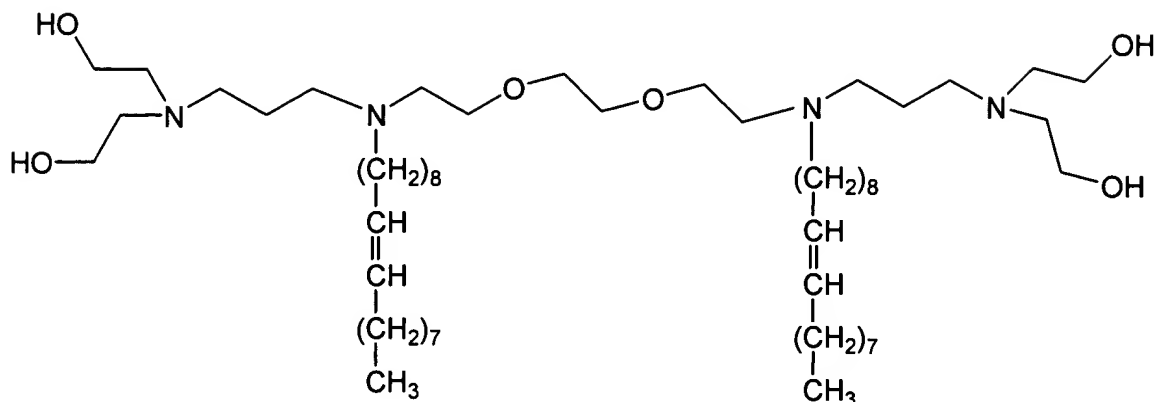
58. (Previously presented) A compound having the formula:



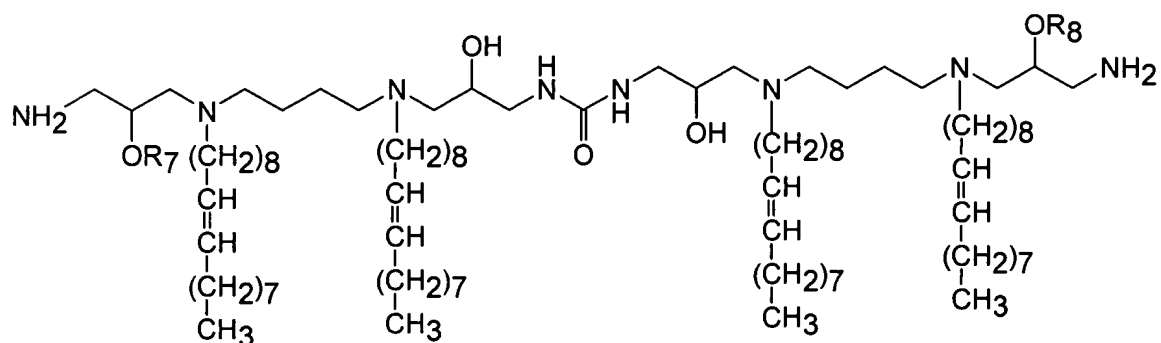
wherein R<sub>7</sub> and R<sub>8</sub> are independently H or a carbohydrate.

59. (Previously presented) The compound as claimed in claim 58, wherein R<sub>7</sub> and R<sub>8</sub> are H.

60. (Previously presented) A compound having the formula:



61. (Previously presented) A compound having the formula:

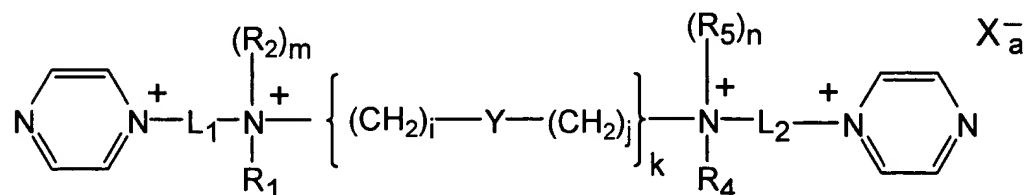


wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

62. (Previously presented) The compound as claimed in claim 61, wherein  $R_7$  and  $R_8$  are H.

63. (Canceled)

64. (Currently amended) A compound having the formula:



wherein

$X^-$  is a physiologically acceptable anion;

a is the number of positive charges in the compound divided by the valence of the anion;

each of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms;

$R_2$  and  $R_5$ , independently of one another, are selected from the group consisting of an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

m and n are 0 or 1;

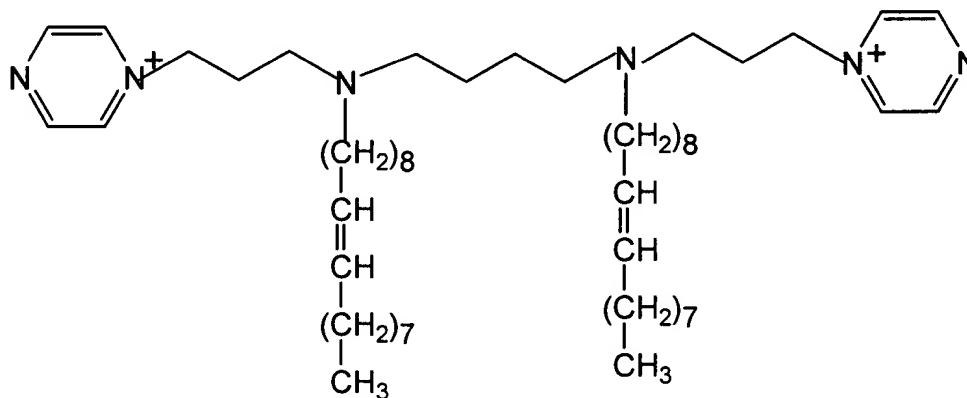
i and j are integers from about 2 to about 3;

k is an integer from 1 to about 3;

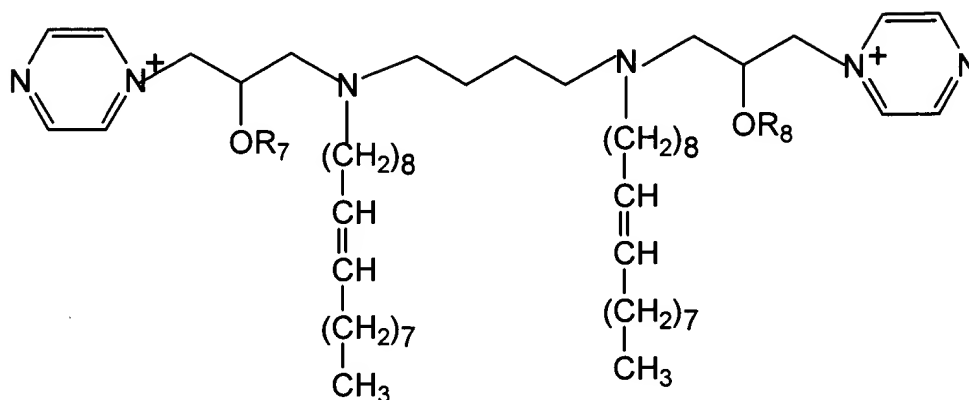
$L_1$  and  $L_2$ , independently from one another, are an alkylene or an alkylene ether; and

Y is selected from the group consisting of  $CH_2$ , O, S and NH.

65. (Currently amended) The compound as claimed in claim 64, which is:



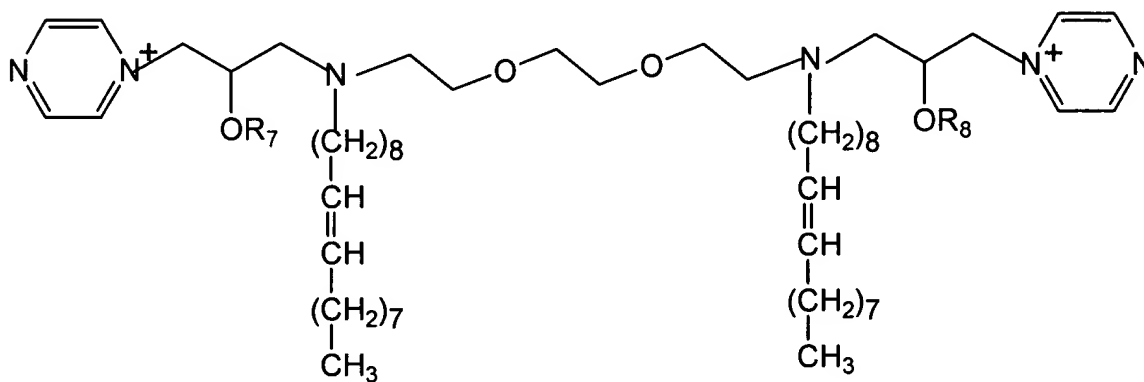
66. (Previously presented) A compound having the formula:



wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

67. (Previously presented) The compound as claimed in claim 66, wherein  $R_7$  and  $R_8$  are H.

68. (Previously presented) A compound having the formula:

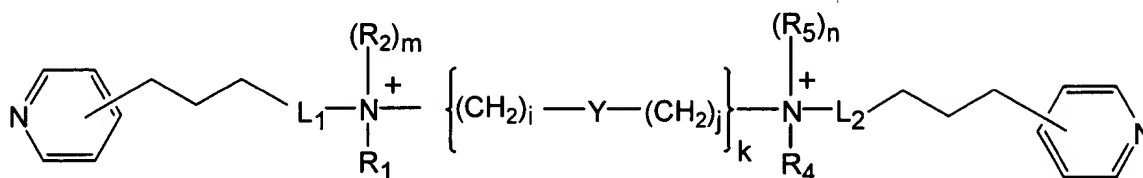


wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

69. (Previously presented) The compound as claimed in claim 68, wherein  $R_7$  and  $R_8$  are H.

70. (Canceled)

71. (Currently amended) A compound having the formula:



wherein

each of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms;

$R_2$  and  $R_5$ , independently of one another, are selected from the group consisting of an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

$m$  and  $n$  are 0 or 1;

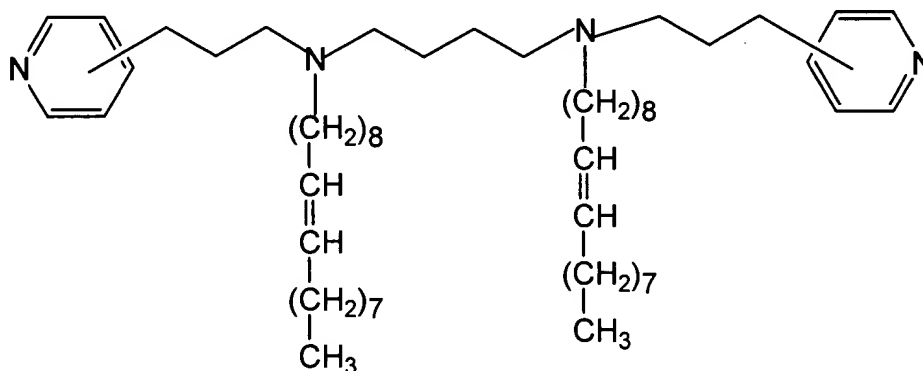
$i$  and  $j$  are integers from about 2 to about 3;

$k$  is an integer from 1 to about 3;

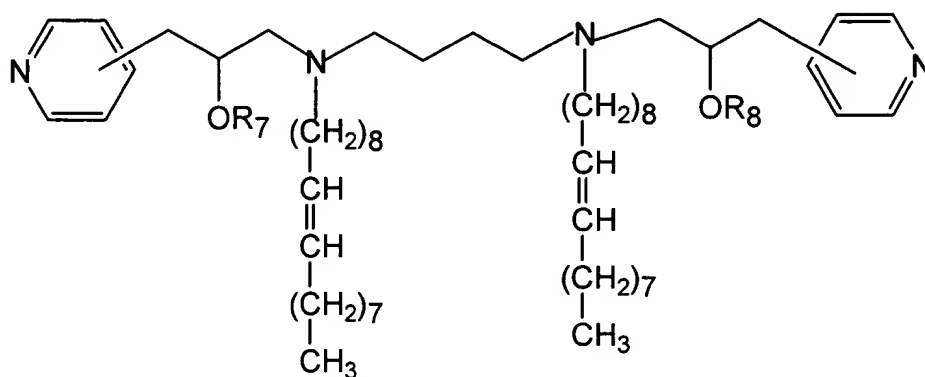
$L_1$  and  $L_2$  independently from one another, are an alkylene or an alkylene ether; and

$Y$  is selected from the group consisting of  $CH_2$ , O, S and NH.

72. (Currently amended) The compound as claimed in claim 71, which is:



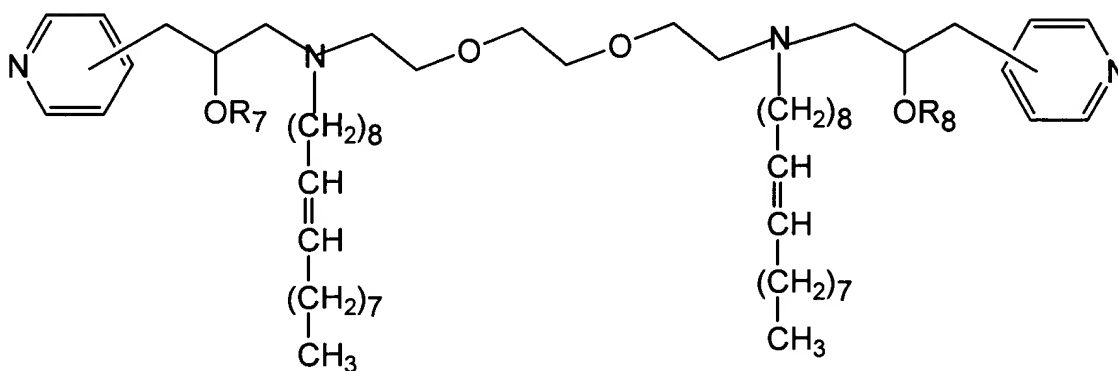
73. (Previously presented) A compound having the formula:



wherein  $\text{R}_7$  and  $\text{R}_8$  are independently H or a carbohydrate.

74. (Previously presented) The compound according to claim 73, wherein  $\text{R}_7$  and  $\text{R}_8$  are H.

75. (Previously presented) A compound having the formula:

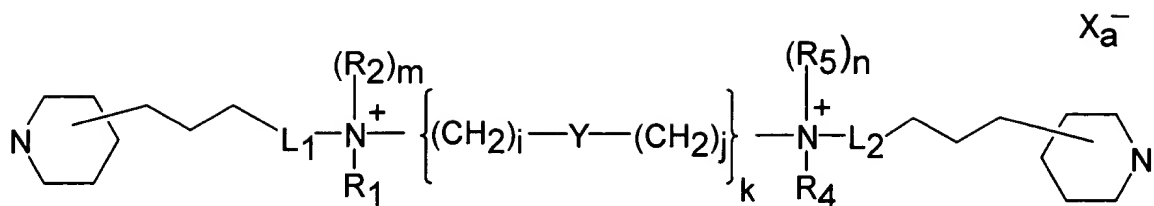


wherein  $\text{R}_7$  and  $\text{R}_8$  independently are H or a carbohydrate.

76. (Previously presented) The compound as claimed in claim 75, wherein  $\text{R}_7$  and  $\text{R}_8$  are H.

77. (Canceled)

78. (Currently amended) A compound having the formula:



wherein

$X^-$  is a physiologically acceptable anion;

$a$  is the number of positive charges in the compound divided by the valence of the anion;

each of  $R_1$  and  $R_4$  is a straight-chain, branched, or cyclic alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms;

$R_2$  and  $R_5$  independently of one another, are selected from the group consisting of an alkenyl group, an aryl group, and an alkyl group optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group;

$m$  and  $n$  are 0 or 1;

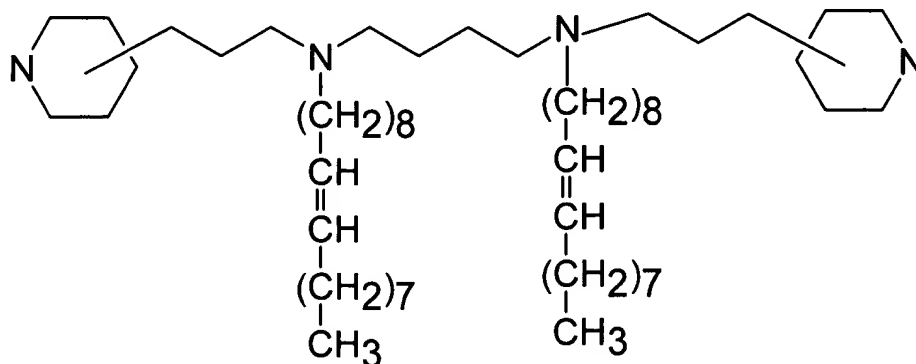
$i$  and  $j$  are integers from about 2 to about 3;

$k$  is an integer from 1 to about 3;

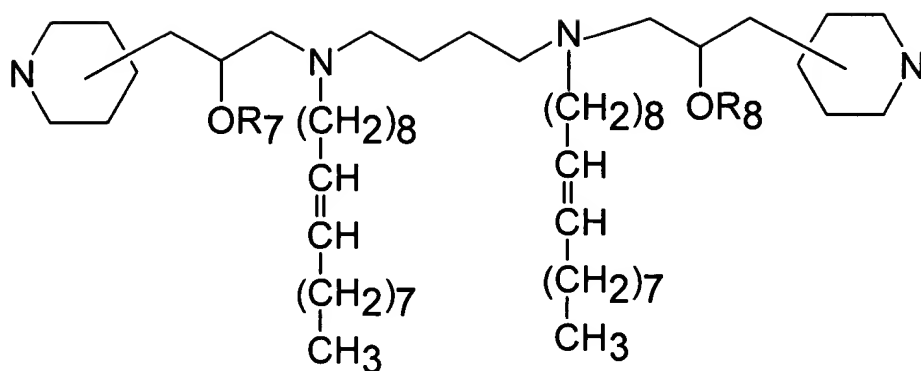
$L_1$  and  $L_2$ , independently from one another, are an alkylene or an alkylene ether; and

$Y$  is selected from the group consisting of  $CH_2$ , O, S and NH.

79. (Previously presented) A compound having the formula:



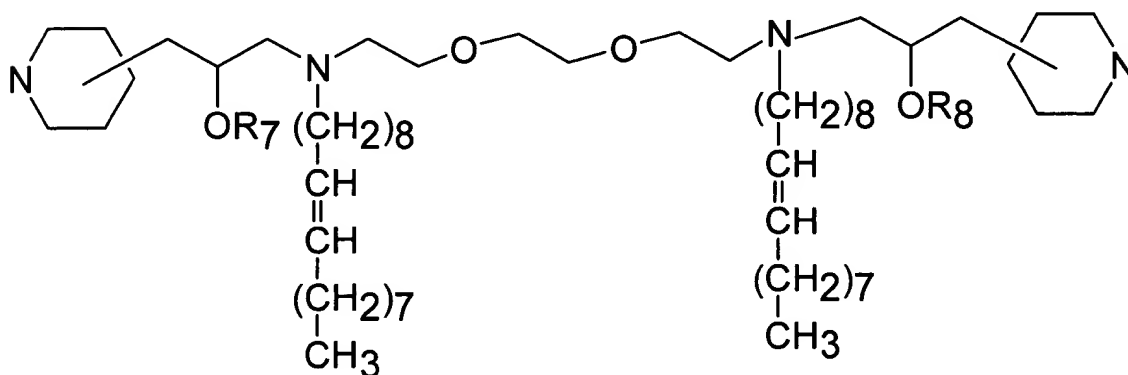
80. (Previously presented) A compound having the formula:



wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

81. (Previously presented) The compound as claimed in claim 80, wherein  $R_7$  and  $R_8$  are H.

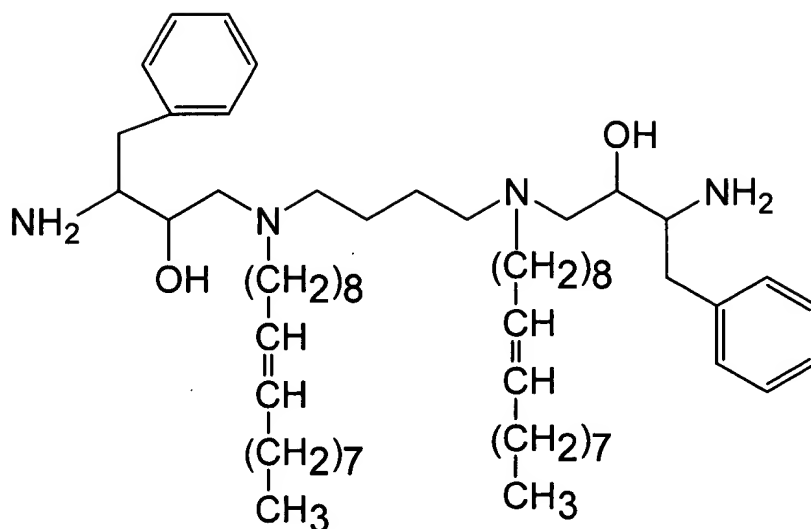
82. (Previously presented) A compound having the formula:



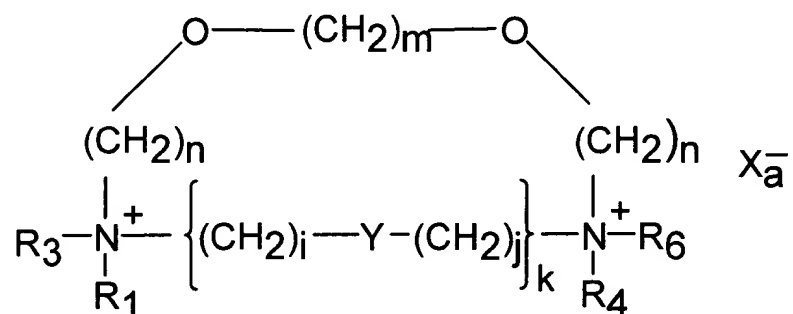
wherein  $R_7$  and  $R_8$  are independently H or a carbohydrate.

83. (Previously presented) The compound as claimed in claim 82, wherein  $R_7$  and  $R_8$  are H.

84. (Previously presented) A compound having the formula:



85. (Currently amended) A compound having the formula:



wherein

$\text{X}^-$  is a physiologically acceptable anion;

$a$  is the number of positive charges in the compound divided by the valence of the anion;

$\text{Y}$  is selected from the group consisting of  $\text{CH}_2$ , an ether, a polyether, an amide, a polyamide, an ester, a sulfide, a urea, a thiourea, a guanidyl, a carbamoyl, a carbonate, a phosphate, a sulfate, a sulfoxide, an imine, a carbonyl, and a secondary amino group and wherein  $\text{Y}$  is optionally substituted by  $-\text{X}_1-\text{L}'-\text{X}_2-\text{Z}$  or  $-\text{Z}$ ;

$\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$ , and  $\text{R}_6$ , independently of one another, are selected from the group consisting of  $\text{H}$ ,  $-(\text{CH}_2)_p-\text{D}-\text{Z}$ , an alkyl group, an alkenyl group, an aryl group, an alkynyl group, and an alkyl ether group wherein any one of  $\text{R}_1$ ,  $\text{R}_3$ ,  $\text{R}_4$ ,

and R<sub>6</sub> are optionally substituted by one or more of an alcohol, an aminoalcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, an alkylthio, a urea, a thiourea, a guanidyl, or a carbamoyl group, and at least one of R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from 6 to about 64 carbon atoms; and R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub> may optionally be covalently linked with each other or with Y, to form a cyclic moiety;

Z is selected from the group consisting of amine, spermiyl, carboxyspermiyl, guanidyl, spermidinyl, putricinyl, diaminoalkyl, pyridyl, piperidinyl, pyrrolidinyl, polyamine, amino acid, peptide, and protein;

X<sub>1</sub> and X<sub>2</sub>, independently of one another, are selected from the group consisting of NH, O, S, alkylene, and arylene;

L' is selected from the group consisting of alkylene, alkenylene, alkynylene, arylene, alkylene ether, and polyether;

D is O, S, or a bond;

m and n are ~~0 or~~ 1; and

i, j, k, l and p are integers from 1 to about 10.

86. (Previously presented) The compound as claimed in claim 85, wherein at least one of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms.

87. (Previously presented) The compound as claimed in claim 85, wherein the alkyl ether optionally substituted by one or more alcohol groups is a carbohydrate.

88. (Previously presented) The compound as claimed in claim 87, wherein the carbohydrate is selected from the group consisting of galactose, fructose, glucose, maltose, sucrose, cellobiose, lactose, mannose, glucopyranose, mannopyranose and galactopyranose.

89. (Previously presented) The compound as claimed in claim 85, wherein

Y is selected from the group consisting of CH<sub>2</sub>, an ether, a polyether, an amide, a polyamide, an ester, a sulfide, a urea, a thiourea, a guanidyl, a carbamoyl, a carbonate, and a secondary amino group.

90. (Previously presented) The compound as claimed in claim 89, wherein at least one of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, alkynyl or aryl group having from about 8 to about 24 carbon atoms.

91. (Previously presented) The compound as claimed in claim 89, wherein the alkyl ether optionally substituted by one or more alcohol groups is a carbohydrate.

92. (Previously presented) The compound as claimed in claim 91, wherein the carbohydrate is selected from the group consisting of galactose, fructose, glucose, maltose, sucrose, cellobiose, lactose, mannose, glucopyranose, mannopyranose and galactopyranose.

93-100. (Canceled)

101. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138.

102. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138 and at least one additional component selected from the group consisting of a cell, cells, a cell culture, a cell culture media, a neutral lipid, a nucleic acid, and a transfection enhancer.

103. (Canceled)

104. (Currently amended) A lipid aggregate comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 56, 64, 71, 75, 78, 85, 89 and 111 or 138.

105. (Canceled)

106. (Canceled)

107. (Currently amended) A kit comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 56, 64, 71, 75, 78, 85, 89 and 111 or 138 and at least one additional component selected from the group consisting of a cell, cells, a cell culture medium, a nucleic acid, a transfection, enhancer and instructions for transfecting a cell or cells.

108. (Currently amended) A method for introducing a polyanion into a cell or cells, said method comprising forming a lipid aggregate from a positively charged compound of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 56, 64, 71, 75, 78, 85, 89 and 111 or 138, contacting the lipid aggregate with a polyanion to form a positively-charged polyanion-lipid aggregate complex and incubating the complex with a cell or cells.

109. (Currently amended) A method for introducing a biologically active substance into a cell, said method comprising forming a lipid aggregate of a compound of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 56, 64, 71, 75, 78, 85, 89 and 111 or 138 and a biologically active substance and incubating the lipid aggregate with a cell or cell culture.

110. (Canceled)

111. (Previously presented) A compound which is:

$N^1, N^4$ -dipalmitoyl- $N^1, N^4$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminobutane;  
 $N^1, N^4$ -distearyl- $N^1, N^4$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminobutane;  
 $N^1, N^4$ -dilauryl- $N^1, N^4$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminobutane;  
 $N^1, N^2$ -dimyristyl- $N^1, N^2$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminoethane;  
 $N^1, N^2$ -dipalmityl- $N^1, N^2$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminoethane;  
 $N^1, N^2$ -dipalmitoyl- $N^1, N^2$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminoethane;  
 $N^1, N^2$ -distearyl- $N^1, N^2$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminoethane;  
 $N^1, N^2$ -dilauryl- $N^1, N^2$ -di-[2-hydroxy-3-(N-aminopropyl)]-diaminoethane;  
 $N^1, N^8$ -dimyristyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^8$ -dipalmityl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^8$ -dipalmitoyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^8$ -distearyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^8$ -dilauryl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^8$ -dioleoyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-aminopropyl)]-Jeffamine;  
 $N^1, N^4$ -dimyristyl- $N^1, N^4$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminobutane;  
 $N^1, N^4$ -dipalmityl- $N^1, N^4$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminobutane;  
 $N^1, N^4$ -dipalmitoyl- $N^1, N^4$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminobutane;  
 $N^1, N^4$ -distearyl- $N^1, N^4$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminobutane;  
 $N^1, N^4$ -dilauryl- $N^1, N^4$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminobutane;  
 $N^1, N^8$ -dimyristyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;  
 $N^1, N^8$ -dipalmityl- $N^1, N^8$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;  
 $N^1, N^8$ -dipalmitoyl- $N^1, N^8$ -di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;

N<sup>1</sup>,N<sup>8</sup>-distearyl-N<sup>1</sup>,N<sup>8</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;

N<sup>1</sup>,N<sup>8</sup>-dilauryl-N<sup>1</sup>,N<sup>8</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;

N<sup>1</sup>,N<sup>8</sup>-dioleyl-N<sup>1</sup>,N<sup>8</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-Jeffamine;

N<sup>1</sup>,N<sup>2</sup>-dimyristyl-N<sup>1</sup>,N<sup>2</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminoethane;

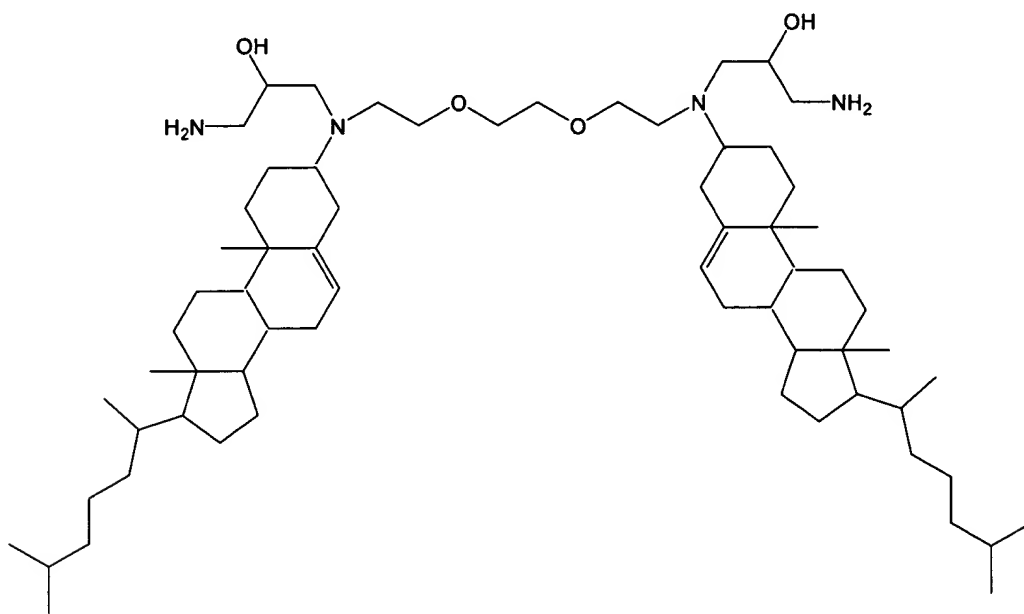
N<sup>1</sup>,N<sup>2</sup>-dipalmityl-N<sup>1</sup>,N<sup>2</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminoethane;

N<sup>1</sup>,N<sup>2</sup>-dipalmitoyl-N<sup>1</sup>,N<sup>2</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminoethane;

N<sup>1</sup>,N<sup>2</sup>-distearyl-N<sup>1</sup>,N<sup>2</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminoethane; or

N<sup>1</sup>, N<sup>2</sup>-dilauryl-N<sup>1</sup>,N<sup>2</sup>-di-[2-hydroxy-3-(N-sperminecarboxamido)-aminopropyl]-diaminoethane.

112. (Previously presented) A compound which is:



113.-116. (Canceled)

117. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138 and at least one additional lipid aggregating compound.

118. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138 and at least one additional lipid aggregating compound, ~~where the additional lipid aggregating forming compound is selected from at least one of~~ DOPE, DOPC or cholesterol.

119. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138 and at least one neutral lipid or at least one other cationic lipid.

120. (Currently amended) A composition comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138 and at least one cationic lipid, ~~where the cationic lipid is selected from the group consisting of~~ DOSPA, DOTMA, DMRIE, DOTAP, DOGS and TM-TPS.

121. (Currently amended) A kit comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89~~ and ~~111~~ or 138.

122. (Currently amended) A kit comprising one or more compounds of any one of claims 1 claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~,

78, 85, ~~89 and 111~~ or 138 and at least one additional lipid aggregating forming compound.

123. (Currently amended) A kit comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89 and 111~~ or 138 and at least one additional lipid aggregating forming compound, ~~where the additional lipid aggregating forming compound is selected from at least one of~~ DOPE, DOPC or cholesterol.

124. (Currently amended) A kit comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89 and 111~~ or 138 and at least one neutral lipid or at least one other cationic lipid.

125. (Currently amended) A kit comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89 and 111~~ or 138 and at least one other cationic lipid, ~~where the cationic lipid is~~ selected from the group consisting of DOSPA, DOTMA, DMRIE, DOTAP, DOGS and TM-TPS.

126. (Currently presented) A lipid aggregate comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89 and 111~~ or 138 and at least one additional lipid aggregating forming compound.

127. (Currently amended) A lipid aggregate comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56~~, 64, 71, ~~75~~, 78, 85, ~~89 and 111~~ or 138 and at least one additional lipid aggregating forming compound, ~~where the additional lipid aggregating forming compound is selected from at least one of~~ DOPE, DOPC or cholesterol.

128. (Currently amended) A lipid aggregate comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56, 64, 71, 75, 78, 85, 89 and 111~~ or 138 and at least one neutral lipid or at least one other cationic lipid.

129. (Currently amended) A lipid aggregate comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, ~~56, 64, 71, 75, 78, 85, 89 and 111~~ or 138 and at least one other cationic lipid selected from the group consisting of DOSPA, DOTMA, DMRIE, DOTAP, DOGS and TM-TPS.

130. Canceled

131. Canceled

132. Canceled

133. (Currently amended) A kit comprising ~~the~~ a lipid aggregate of claim 128 comprising one or more compounds of any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 64, 71, 78, 85, and 138 and at least one neutral lipid or at least one other cationic lipid.

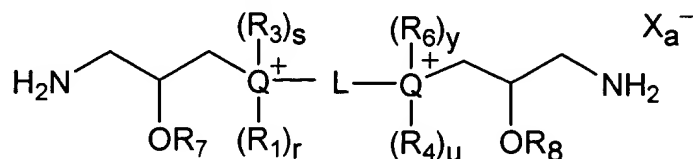
134. Canceled

135. (Currently amended) The compound of claim 12 wherein R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub>, independently of one another, are selected from the group consisting of H, and an alkyl group and at least two of R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub>, are straight-chain alkyl groups having from 8 to ~~about~~ 24 carbon atoms attached to each N.

136. (Currently amended) The compound of claim 135 wherein at least two of  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$ , are straight-chain alkyl groups having from 14 or 16 carbon atoms attached to each N.

137. (Canceled)

138. (New) A compound having the formula:



where:

Q is N;

L is a bivalent organic radical covalently linking each Q;

r, s, u and y are 1;

$\text{X}^-$  is a physiologically acceptable anion;

a is the number of anions which is equal to the number of positive charges in the compound divided by the valence of the anion;

$R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$ , independently of one another, are selected from the group consisting of H, an alkyl group, an alkenyl group, an alkynyl group, and an aryl group, wherein any one of  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$  are optionally substituted by one or more of an alcohol, an amine, an amide, an ether, a polyether, a polyamide, an ester, a mercaptan, a urea, a thiourea, a guanidyl, or a carbamoyl group, and at least two of  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$ , are straight-chain, branched, or cyclic alkyl, alkynyl, or alkenyl groups having from 8 to 24 carbon atoms attached to each N and  $R_1$ ,  $R_3$ ,  $R_4$  and  $R_6$  are optionally covalently linked with each other; and

$R_7$  and  $R_8$  are independently H or a carbohydrate.

139. (New) The compound of claim 138 wherein  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$ , independently of one another, are selected from the group consisting of H, an alkyl group, an alkenyl group, or an alkynyl group.

140. (New) The compound of claim 138 wherein  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$ , independently of one another, are selected from the group consisting of H, and an alkyl group.

141. (New) The compound of claim 138 wherein  $R_7$  and  $R_8$  are H.

142 (New) The compound of claim 138 wherein two of  $R_1$ ,  $R_3$ ,  $R_4$ , and  $R_6$  are alkyl groups having 14 or 16 carbons.

## REMARKS

Claims 10, 12-14, 16-19, 21-36, 38, 40, 41, 43, 44, 46, 47, 49-62, 64-69, 71-76, 78-92, 101, 102, 104, 107-109, 111, 112, and 117-136 were in this case. This amendment adds new claims 138-142. Claims 130-132 and 134 have been canceled because they improperly depended from multiply dependent claims. Claims 12, 16, 18, 19, 21, 25, 27, 32, 41, 46, 47, 49, 50, 53, 55, 56, 57, 60, 64, 65, 71, 72, 78, 79, 85, 101, 102, 104, 107-109, 117-129, 133, 135, and 136 have been amended as detailed below. Claims 10, 12-14, 16-19, 21-36, 38, 40, 41, 43, 44, 46, 47, 49-62, 64-69, 71-76, 78-92, 101, 102, 104, 107-109, 111, 112, 117-129, 133, 135-142 are now in this case.

Claims 10, 16-19, 22-28, 30-41, 43, 44, 46, 47, 49-62, 64-69, 71-76, 78-92, 111 and 112 are allowed.

Claim 12 was rejected and claims 13 and 14 were objected to as dependent upon a rejected claim.

The disposition of claims 21, 29, 101, 102, 104, 107-109, and 117-136 was not listed in the Office Action mailed November 26, 2004.

The undersigned thanks Examiner Epps-Ford for the courtesy of a telephone interview on February 16, 2005 to discuss the claims remaining in this case. During that interview, the Examiner indicated that amendment of claim 12 to replace "8 to about 24 carbon atoms" with "8 to 24 carbon atoms" would place claim 12 in condition for allowance. The subject matter of the new claims was also discussed and this amendment is consistent with that discussion.

### Amendments to the Claims

New claims 138-142 have been added. Claim 138 is supported in the specification at page 17 in formula A1 and in the definitions of L on page 15, line 19, Q (as N) on page 17, line 15 and R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub> as defined on page 17,

lines 12-17 with the additional recitations that the alkyl, alkenyl, and alkynyl groups have 8-24 carbon atoms (as supported on page 50, line 26, and page 51, lines 4 and 12). The variables r, s, u, and y are defined as being 1 which is consistent with the positive charge shown in the formula (where Q is N). Definitions of other variables are supported in the specification and in the original claims. Claims 139-142 depend from claim 138 and are supported as noted above and in the original claims.

Claim 12 has been amended to recite that in the compound "at least two of R<sub>1</sub>, R<sub>3</sub>, R<sub>4</sub>, and R<sub>6</sub>, are straight-chain, branched, or cyclic alkyl, alkynyl, or alkenyl groups having from 8 to 24 carbon atoms attached to each N."

Claims 16, 41, 49, 64, 71, 78 and 85 have been amended to recite that the variables m and n are equal to 1 for improved consistency with the positive charge in the formula of the claim.

Claim 21 has been amended to recite that in the compound "at least one of R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkyl, alkenyl, or alkynyl having from 8 to 24 carbon atoms. This claim has also been amended to recite that the variable m and n are 1 for improved consistency with the formula of the claim and to remove a phrase that is unnecessary in the claim as amended.

Claim 32 has been amended to recite that "R<sub>1</sub> and R<sub>4</sub> is a straight-chain, branched, or cyclic alkenyl, or alkynyl group having 8 to 24 carbon atoms."

Claim 46 was amended to recite that the variables m and n are 1 for improved consistency with the formula of the claim and to remove a phrase that is unnecessary in the claim as amended.

Claim 55 was amended to recite that the variables m, n, r and u are 1 for improved consistency with the formula of the claim.

Claims 18, 19, 25, 27, 47, 50, 65 and 72 have been made independent for consistency with the amendments of claims 16, 21, 46, 49 64 and 71.

Claims 56 has been amended to depend from claim 55. This amendment does not change the scope of this claim and was made to reduce the number of independent claims in the case.

Multiply dependent claims 101, 102, 104, 107, 108, 109, and 117-130 have been amended such that they each recite dependence from any one of claims 12, 16, 21, 29, 32, 33, 35, 38, 41, 46, 49, 55, 64, 71, 78, 85 or 138. This amendment was made in part for consistency with other amendments and in part to reduce additional claims fees.

Claims 130-134 improperly depended from a multiply dependent claim. Claim 133 was rewritten as a multiply dependent claim incorporating the language of claim 128 from which it depended. Claims 130-132 and 134 were canceled without prejudice or disclaimer to avoid a significant increase in the number of claims and excess claims fees.

Claim 135 was amended to recite "8 to 24 carbon atoms."

Claim 136 was amended to correct a clerical error by removing an extraneous "from."

None of the amendments to the claims represents the addition of new matter.

#### The Rejection

Claims 12 was rejected under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, because it was alleged that the phrase "8 to about 24 carbon atoms" was not supported in the specification. Claim 12 has been amended to recite "8-24 carbon atoms"

which is supported in the specification at page 50, line 26, and page 51, lines 4 and 12. This amendment obviates the rejection of claim 12. Claim 12 should be considered allowable over this rejection and the objection to claims 113 and 114 should be withdrawn.

No rejection was made of claims 21, 29, 101, 102, 104, 107-109, or 117-136.

#### Conclusion

This amendment is believed to place all of the claims in condition for allowance and passage to issuance is respectfully requested. This amendment cancels several multiply dependent claims, makes one claim (claim 133) multiply dependent, and adds nine independent claim and three dependent claims. It is believed excess claims fees are due for additional independent claims. Please deduct any required excess claims fees that may be due from deposit account 07-1969. It is believed that no Petition for Extension of Time is needed to make this submission timely filed. If this is incorrect please deduct the required petition fees from deposit account 07/1969.

Respectfully submitted,

Sally A. Sullivan  
Reg. No. 32,064

GREENLEE, WINNER and SULLIVAN, P.C.  
5370 Manhattan Circle, Suite 201, Boulder, CO 80303  
Telephone (303) 499-8080; Fax (303) 499-8089  
email: [ssullivan@greenwin.com](mailto:ssullivan@greenwin.com)  
Attorney docket no. 61-03  
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